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Date: 10-24-03

Himanshu S. Amin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicant(s): Matthew Conway, *et al.*

Serial No: 09/335,640

Filing Date: June 18, 1999

Examiner: Tadesse Hailu

Art Unit: 2173

Title: METHODS, APPARATUS AND DATA STRUCTURES FOR PROVIDING A USER INTERFACE TO OBJECTS, THE USER INTERFACE EXPLOITING SPATIAL MEMORY AND VISUALLY INDICATING AT LEAST ONE OBJECT PARAMETER

MS Appeal Brief-Patents
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REPLY BRIEF TO EXAMINER'S ANSWER DATED AUGUST 26, 2003

Dear Sir:

Applicants submit this brief in triplicate in connection with an appeal of the above-identified application. Please charge $330.00 for the fee associated with this brief to Deposit Account No. 50-1063, Order No. MSFTP362US. A Request for Oral Hearing is being filed concurrently herewith.

I. Real Party in Interest (37 C.F.R. § 1.192(c)(1))

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. § 1.192(c)(2))

Appellants, appellants' legal representatives, and/or the assignee of the present application are unaware of any appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. § 1.192(c)(3))

Claims 1-63 are currently pending in the present application. The rejection of claims 1-9, 11, 12, 14,16-22, 24, 33-40, 42, 44, 46-51, 53, 54, 56, and 58-63, and the objection to claims 10, 13, 15, 23, 25-32, 41, 43, 45, 52, 55, and 57, are appealed.

IV. Status of Amendments (37 C.F.R. § 1.192(c)(4))

No claim amendments have been made subsequent to the final rejection of May 28, 2002.

V. Summary of Invention (37 C.F.R. § 1.192(c)(5))

The claimed invention relates to generating visual representations of objects in a graphical user interface. More specifically, the invention relates to ***rendering a thumbnail such that depth of the thumbnail in a three-dimensional environment is a function of at least one parameter of an object associated with the thumbnail.*** Contrary to prior art techniques which render thumbnail as a function of the thumbnail itself, the subject invention provides for rendering of thumbnails as a function of an object (*e.g.*, a document, a spread sheet, a business contact, a drawing, a picture or image, a web page, a resource location or directory) represented by the thumbnail. *See, e.g.*, page 23, line 23 to page 24, line 2. The claimed invention provides for a rich 3D experience since thumbnails are rendered as a function of parameter(s) of objects represented by the thumbnails that are meaningful to a user as compared to prior art systems that are in general solely concerned with display space utilization. For example, *via* the claimed

invention thumbnails representing objects of greater importance (*e.g.*, high priority documents, time sensitive matters...) can be rendered with a depth such that they appear closer to a user than thumbnails representing objects of less relative importance. *See, e.g.*, page 17, line 25 to page 18, line 4, and page 23, lines 24-28.

The claimed invention *can map values of properties or parameters of the object information to a depth*. The values of the properties or parameters of the object are ***unique to each object***. *See, e.g.*, page 42, lines 25-28. Using this depth information, the present invention renders the thumbnail of the information object in the simulated three-dimensional tank at a simulated depth. ***As values of properties or parameters of objects change, the simulated depth at which they are rendered can change.*** *See, e.g.*, page 25, lines 4-6. Values of properties or parameters of the objects can be changed by the user ***or can be changed by via an algorithm in response to an indirect user action***, such as an *absence* of user action associated with a given object. *See, e.g.*, page 45, lines 8-25. In this manner, the simulated depth of an object can change ***automatically***. For example, a parameter *associated with* the object might be a due date. As the due date draws near, so to does rendering of the object. This *parameter* of the object *is not necessarily directly related* to the object (*e.g.*, as would be the physical size of the object, height times width.)

VI. Statement of the Issues (37 C.F.R. § 1.192(c)(6))

Whether claims 1-9, 11, 12, 14,16-22, 24, 33-40, 42, 44, 46-51, 53, 54, 56, and 58-63 are patentable under 35 U.S.C. §103(a) over Robertson *et al.* (U.S. 6,166,738) and Joskowicz *et al.* (U.S. 5,669,006).

Applicants' representative acknowledges with appreciation the indication that claims 10, 13, 15, 23, 25-32, 41, 43, 45, 52, 55 and 57 would be allowable if recast in independent form to include all limitations of respective base claims and any intervening claims. The option to recast these claims in such form at a later date if necessary is respectfully reserved.

VII. Grouping of Claims (37 C.F.R. § 1.192(c)(7))

For the purposes of this appeal only, the claims are grouped as follows:

Claims 1-63 stand or fall together.

VIII. Argument (37 C.F.R. § 1.192(c)(8))

A. Rejection of Claims 1-9, 11, 12, 14,16-22, 24, 33-40, 42, 44, 46-51, 53, 54, 56, and 58-63 Under 35 U.S.C. §103(a)

Claims 1-9, 11, 12, 14,16-22, 24, 33-40, 42, 44, 46-51, 53, 54, 56, and 58-63 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Robertson *et al.* and Joskowicz *et al.* A reversal of the rejection is respectfully requested for at least the following reasons. Neither Robertson *et al.* nor Joskowicz *et al.*, alone or in combination, discloses every limitation of the claimed invention. The references, if combined as suggested by the Examiner, would not result in the invention as claimed.

Applicable Law

> To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See* MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *See In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

> "Those charged with determining compliance with the Patent Act, 35 U.S.C.S. §103, are required to place themselves in the minds of those of ordinary skill in the relevant art at the time the invention was made, to determine whether that which is now plainly at hand would have been obvious at such earlier time. The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time. The invention must be evaluated not through the eyes of the inventor, who may have been of exceptional skill, but as by one of ordinary skill." *Interconnect Planning Corporation v. Thomas E. Feil, Robert O. Carpenter, V Band Systems, Inc., and Turret Equipment Corp.*, 744 F.2d 1132, 1138; 227 USPQ 543.

The subject invention as recited in independent claim 1 recites "...determining a two-dimensional location and a depth of each of the thumbnails in the three-dimensional environment, wherein, ***for each of the thumbnails, the depth is a function of at least one parameter of the object associated with*** ***the thumbnail***...". Independent claims 34, 61 and 62 recite similar features as that noted above with respect to claim 1. Neither Robertson, *et al.* nor Joskowicz, *et al.*, alone or in combination, teach or suggest such claimed feature of applicants' invention. Such feature of the claimed invention provides for mapping values of properties or parameters of object information to a depth. Using this depth information, the present invention renders the thumbnail of the information object in a simulated three-dimensional tank at a simulated depth. Furthermore, ***as values of properties or parameters of the objects change, the simulated depth at which they are rendered may change.*** *See* page 17, line 25 to page 18, line 4. Thus, the simulated depth at which a thumbnail is rendered ***can change without user intervention.*** For example, as a deadline approaches, the depth of an icon can be decreased by the subject invention. Such feature of the claimed invention provides for mapping values of properties or parameters of object information to a depth in a manner that ***automatically adjusts the depth*** of a thumbnail upon changes in parameter value. Accordingly, simulated depth of thumbnails respectively can be a function of a parameter (*e.g., including but not limited to* object priority, object age, object size (MB), preference for an object by a user relative to other objects, object status, object version, *etc.*) of respective objects. *See, e.g.*, page 63, line 27 to page 64, line 2. Thus, a thumbnail associated with a high-priority object can be rendered at less simulated depth (*e.g.*, closer to viewer) than a thumbnail associated with a low-priority object.

The cited references do not teach or suggest such feature. The cited references do not associate depth of a rendered thumbnail with at least one parameter of an object associated with the thumbnail. The Office Action dated May 28, 2002, at paragraph 9, page 11, incorrectly advances that Joskowicz, *et al.* teaches such feature at col. 3, lines 55-col. 8, lines 51, and Fig. 9. Rather, Joskowicz, *et al.* simply teaches rendering of icons (including Z-axis based rendering) as a function of the *icons themselves* (*e.g.*, size, area, predefined constraints relating to spacing of the icons), but not as a ***function of at least one parameter of an object associated with*** the displayed thumbnail as defined in the claimed invention. As described in the specification of the present invention, parameters used to determine thumbnail depth can be fixed or can be

associated with user input. The user input can be either direct (*e.g.*, the *user* changes the parameter) or indirect (*e.g.*, the user takes some action that results in a parameter change, such as clicking on thumbnail(s)). *See, for example*, page 44, line 11 to page 45, line 25.

The Advisory Action dated November 27, 2002 relies on Joskowicz *et al.* alone to disclose the element of using the "size" as a parameter of an object to directly proportion the depth of the object, wherein a user may later *directly* alter the depth of the object. However, Joskowicz *et al.* does not teach or suggest rendering an icon as a function of at least one parameter of an object associated with the displayed icon as "parameter" as defined in the present application, nor does it teach rendering the icon in a manner that permits automatic depth adjustment in response to a change in the parameter. Rather, Joskowicz *et al.* merely suggests "z-ordering" thumbnails by *surface area* so that larger thumbnails do not obscure smaller thumbnails. This is to be distinguished from using *file size* (*e.g.* megabyte value, *not physical size*) as a parameter for determining depth placement of a thumbnail. That is, Joskowicz *et al.* teaches rendering an icon as a function of *a parameter associated directly with the icon, i.e.* the depth of the icon is directly related to the physical size of the icon (height times width). The present invention renders an icon as a function of ***a parameter of an object associated with the icon***, wherein the icon is rendered as a function of an object (*e.g.*, a deadline associated with the icon) represented by the icon rather than the icon itself. *See, e.g.*, claim 1. *See also, e.g.*, page 65, lines 11-28.

The Examiner's Answer dated August 26, 2003, contends that "In contrast to Appellants' argument, Robertson and Joskowicz teach the depth as a function of a parameter (such as priority or arrangement of episodes) of the object associated with the thumbnail." (Page 18, lines 18-20.) Only once is the word "priority" mentioned in the Joskowicz patent, which mention occurs at Column 4, line 22. The "priority" of which Joskowicz *et al.* speaks is the priority of the constraints (*i.e.*, rules) by which icon rendering is governed. For example, according to Joskowicz *et al.*, the requirement that "a button should always be fully visible" supercedes the requirement that "a portion of text may not be hidden behind another episode." If these two *physical features of the thumbnails themselves* are in conflict, Joskowicz *et al.* requires that the button be made visible at the cost of hiding text behind another episode. This "priority" is not a function of a parameter of an object associated with the thumbnail, but rather is merely a

function of a *rule set* for determining what portion of a thumbnail will be made visible *based on the physical properties of the thumbnail itself.*

Furthermore, Robertson *et al.* and Joskowicz *et al.* both are concerned with rendering of thumbnails/icons so as to optimize utilization of valuable screen real estate *via* three-dimensional rendering of the thumbnails. However, neither reference teaches or suggests that the placement of the thumbnails in three-dimensional space is also a function of at least *one parameter of an object associated* with the rendered thumbnail. The subject claimed invention provides for three-dimensional rendering of thumbnails so as to provide for organizing and rendering the thumbnails as a function of ***relevance*** (as defined, for example, by the number of clicks since last use by the user) of the objects associated with the thumbnails. *See, e.g.*, page 45, lines 8-25. Such aspect of the claimed invention provides for optimizing rendering of the thumbnails not only with respect to utilization of valuable screen real estate but *also with respect to relevance of the respective objects* (associated with the thumbnails) to a user as defined by at least one parameter of the respective objects. *See, e.g.*, page 45, lines 8-25. Furthermore, "[a]s shown in Figure 3, an object record 304 may include an ***object identifier*** field 306 which ***includes a value used to distinguish the object from all other objects.***" (Page 42, lines 22-25.) Neither of the cited references teaches or suggests this aspect of the present invention. Thus, the claimed invention provides for a richer and more refined technique for rendering thumbnails that is not disclosed, suggested or even contemplated by the cited references.

Additionally, Joskowicz *et al.* does not teach a "depth parameter of the object thumbnails on the three dimensional surface" or "three-dimensional features of an object, such as depth information." "Depth," as used in Joskowicz *et al.*, is a vector of elements that are ordered from back to front without three-dimensional perspective (Column 5, lines 4-5). The depth of Joskowicz *et al.* does not have a perspective. Depth is only a Z-ordering (Column 3, lines 37-38), and the Z-ordering is only an order of objects from back to front (Column 4, lines 3-10). The constraint $Z(I) \leq Z(I+1)$ is a constraint on the order in which elements are inserted into a Z-list. No function (linear or polynomial) for calculating a three dimensional depth is taught or suggested in Joskowicz *et al.* Element $E_i << E_{i+1}$ is merely a statement of relative position, but has no affect on how either element is rendered. In particular, *the elements are not scaled to create the illusion of depth.* The Z-order is merely for calculating which elements occlude

others. Note that the bounds on area are completely independent of depth (Column 5, line 65). Also, the word "perspective" does not appear in Joskowicz *et al.* and the Z dimension, which is an order, is different from the X and Y dimensions, which are true coordinate systems (Column 3, lines 31-35).

> "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984)

In fact, Joskowicz *et al.* teaches away from the subject invention and from Robertson. In particular, Joskowicz *et al.* teaches of putting elements with *larger areas at the back* of the z-order (with no scaling for perspective) and the *smaller elements at the front*, which *teaches away from a perspective view in which farther away elements appear smaller*, as set forth in the subject application (Column 7, lines 27-30). A reference that teaches away from another reference may not be combined there with to form the basis of a 35 U.S.C. §103 rejection. (*See, e.g., In Re Grasselli*, 713 F.2d 731, 218 USPQ 769, 779, Fed. Cir. 1983; "It is improper to combine references where the references teach away from their combination.")

As per claim 2 and 3, the *depth* of Joskowicz *et al.* is never calculated with a linear or polynomial function. Only the *constraints on the area* of the different objects in the cliques are disclosed in Column. 4, line 52-Column 6, line 62. Also, Joskowicz *et al.* does not disclose *three-dimensional* depth, as discussed above.

In view of at least the above, it is respectfully submitted that the subject invention as recited in independent claims 1, 34, 61 and 62 (and claims 2, 3, 5-9, 11, 12, 14, 16-22, 24, 33, 35-40, 42, 44, 46-51, 53, 54, 56, and 58-60 and 63 which respectively depend there from) is not obvious over the combination of Robertson, *et al.* and Joskowicz, *et al.* Specifically, claims 5, 6, 7, 8, 9, 11, 12, 14, 16, 27, 18, 19, 20, 21, 22, 24, 33, 35-40, 42, 44, and 46 depend upon a rejected base claim that is believed to be allowable. Therefore, allowance of these claims is respectfully requested. Claims 47,48,49,50,51,53,54,56,58,59, and 60 reference a claim that is believed to be allowable, and therefore allowance of these claims is also respectfully requested. Claims 61 and 63, which correspond generally to claim 1, are believed to be allowable for the above reasons. Claim 62 corresponds to claim 34 and is believed to be allowable for the above

reasons.

B. **Rejection of Claim 4 Under 35 U.S.C. §103(a)**

Claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Robertson, *et al.* and Joskowicz, *et al.* and Baldwin (U.S. 5,701,444). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 4 depends from independent claim 1, and Baldwin fails to make up for the aforementioned deficiencies of Robertson, *et al.* and Joskowicz, *et al.* with respect to claim 1. Thus, this rejection should be withdrawn.

IX. Conclusion

It is readily apparent from at least the above comments that neither Robertson *et al.* nor Joskowicz *et al.*, alone or in combination, discloses applicants' invention as recited in independent claims 1, 34, 61, and 62. Claims 2-33, 35-60, and 63 depend directly or indirectly from independents claims 1, 34, and 61. Accordingly, a reversal of the rejection of claims 1-9, 11, 12, 14,16-22, 24, 33-40, 42, 44, 46-51, 53, 54, 56, and 58-63, and a removal of the objection to claims10, 13, 15, 23, 25-32, 41, 43, 45, 52, 55, and 57, is respectfully requested.

Respectfully submitted,
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X. **Appendix of Claims (37 C.F.R. § 1.192(c)(9))**

1. A man-machine interface method for permitting a user to act on thumbnails, each thumbnail representing an associated object containing information, for use with a machine having a video display device and a user input device, the man-machine interface method comprising:

a) generating a three-dimensional environment, having a depth, to be rendered on the video display device;

b) determining a two-dimensional location and a depth of each of the thumbnails in the three-dimensional environment, wherein, for each of the thumbnails, the depth is a function of at least one parameter of the object associated with the thumbnail; and

c) generating the thumbnails within the three-dimensional environment, at the determined two-dimensional locations and depths, to be rendered on the video display device.

2. The man-machine interface method of claim 1 wherein, for each of the thumbnails, the depth is a linear function of at least one parameter of the object associated with the thumbnail.

3. The man-machine interface method of claim 1 wherein, for each of the thumbnails, the depth is a polynomial function of at least one parameter of the object associated with the thumbnail.

4. The man-machine interface method of claim 1 wherein, for each of the thumbnails, the depth is an exponential function of at least one parameter of the object associated with the thumbnail.

5. The method of claim 1 wherein the at least one parameter includes at least one parameter selected from a group of parameters consisting of (a) click history, (b) age, (c) time since last use, (d) size, (e) file type, (f) associated application, (g) classification, and (h) author.

6. The man-machine interface method of claim 1 further comprising:

d) accepting inputs from the user input device;

e) determining a two-dimensional cursor location based on the accepted inputs; and

f) generating a cursor at the determined two-dimensional cursor location, to be rendered on the video display device.

7. The man-machine interface method of claim 6 further comprising:

g) if the two-dimensional location of the cursor is located on or over one of the thumbnails, defining a state of that thumbnail as active.

8. The man-machine interface method of claim 7 further comprising:

h) generating a pop-up information bar located over the active thumbnail, to be rendered on the video display device.

9. The man-machine interface method of claim 7 further comprising:

h) if the user input provides a selection input and if an active or floated thumbnail exists, then generating a higher resolution visual representation of the object represented by and associated with the active or floated thumbnail, at a preferred viewing location at a foreground of the three dimensional environment, to be rendered on the video display device.

10. The man-machine interface method of claim 7 further comprising:

h) if the user input provides a float input and if an active thumbnail exists, then setting the depth of the active thumbnail to a predetermined value and defining a state of the active thumbnail as floated.

11. The man-machine interface method of claim 9 wherein the act of generating the higher resolution visual representation of the object represented by and associated with the active thumbnail includes:

- generating an animation which moves the higher resolution visual representation of the object represented by and associated with the active thumbnail from the location of the active thumbnail to the preferred viewing location at the

foreground of the three dimensional environment, to be rendered on the video display device.

12. The man-machine interface method of claim 11 further comprising:

i) if the user input provides a deselection input and if a selected thumbnail exists, then generating a video output for moving the high resolution visual representation of the object represented by and associated with the active thumbnail to the two-dimensional location of the selected thumbnail, to be rendered on the video display device.

13. The man-machine interface method of claim 9 further comprising:

i) if the user input provides a sink input and if a floated thumbnail exists, then setting the depth of the floated thumbnail to a previous value and defining a state of the floated thumbnail as active.

14. The man-machine interface method of claim 7 further comprising:

h) if the user input provides a selection input and if an active thumbnail exists, then

i) invoking an application related to the object represented by and associated with the active thumbnail,

ii) loading the object represented by and associated with the active thumbnail into the application, and

iii) generating a video output of the application with the loaded object represented by and associated with the active thumbnail at a preferred viewing location, to be rendered on the video display device.

15. The man-machine interface method of claim 9 further comprising:

h) if the user input provides a selection input and if a floated thumbnail exists, then

i) invoking an application related to the object represented by and associated with the floated thumbnail,

ii) loading the object represented by and associated with the floated thumbnail into the application, and

iii) generating a video output of the application with the loaded object represented by and associated with the floated thumbnail at a preferred viewing location, to be rendered on the video display device.

16. The man-machine interface method of claim 7 further comprising:

h) if the user input provides a move input and if an active or floated thumbnail exists, then

i) updating the two-dimensional location of the active or floated thumbnail based on the move input.

17. The man-machine interface method of claim 16 wherein the move input is a left button mouse drag.

18. The man-machine interface method of claim 1 wherein the three-dimensional environment defines a foreground and a background, and

wherein the act of generating thumbnails, within the three-dimensional environment, at the determined two-dimensional locations and depths, to be rendered on the video display device, includes:

i) using perspective views so that any thumbnails in the foreground defined by the three-dimensional environment appear larger than any thumbnails in the background defined by the three-dimensional surface.

19. The man-machine interface method of claim 18 wherein a thumbnail partially occludes any thumbnails behind it, based on a viewing point.

20. The man-machine interface method of claim 1 further comprising:

d) accepting inputs from the user input device;

e) determining a viewing point two-dimensional location, depth and direction based on the accepted inputs; and

f) generating only that portion of the three-dimensional environment and only those thumbnails that are in front of the virtual viewing point determined in act (e), to be rendered on the video display device.

21. The man-machine interface method of claim 1 wherein the thumbnails are low resolution bit maps.

22. The man-machine interface method of claim 21 wherein the low resolution bit maps are 64 pixels by 64 pixels and have 24 bit color.

23. The method of claim 20 wherein if the depth of the viewing point is below a predetermined depth, further performing a step of:

g) gradually decreasing the depth of the viewing point to float the viewing point while no user inputs are received.

24. The method of claim 1 further comprising, for each of the thumbnails, determining a shade to be applied to the thumbnail based on its depth.

25. The method of claim 24 wherein the shade to be applied to the thumbnail darkens as the depth increases.

26. The method of claim 24 wherein the shade to be applied to the thumbnail darkens as a distance between the depth of the thumbnail and a viewing point increases.

27. The method of claim 1 further comprising, for each of the thumbnails, determining a fade to be applied to the thumbnail based on its depth.

28. The method of claim 27 wherein the fade to be applied to the thumbnail increases as the depth increases.

29. The method of claim 27 wherein the fade to be applied to the thumbnail increases as a distance between the depth of the thumbnail and a viewing point increases.

30. The method of claim 1 further comprising, for each of the thumbnails, determining a tint to be applied to the thumbnail based on its depth.

31. The method of claim 30 wherein the tint to be applied to the thumbnail increases as the depth increases.

32. The method of claim 30 wherein the tint to be applied to the thumbnail increases as a distance between the depth of the thumbnail and a viewing point increases.

33. The method of claim 1 wherein the three dimensional environment includes a floor, the method further comprising a step of generating a shadow, for each of the thumbnails, on the floor.

34. A system which permits a user to interact with thumbnails, each thumbnail representing an associated object containing information, the system comprising:

a) an input facility for accepting user inputs;

b) a storage facility containing

i) a two-dimensional location, a depth and state information for each of the thumbnails,

ii) a two-dimensional cursor location, and

iii) a three-dimensional environment having a simulated depth;

c) a processing unit which

i) accepts user inputs from the input facility,

ii) updates (a) the two-dimensional location, and state information for each of the thumbnails contained in the storage facility, and (b) the two-dimensional cursor location contained in the storage facility, based on the accepted user inputs,

iii) updates depth information for each of the thumbnails contained in the storage facility based on at least one parameter of the object associated with the thumbnail, and

iv) generates video outputs based on

A) the two-dimensional location, depth and state information for each of the thumbnails,

B) the two-dimensional cursor location, and

C) the three-dimensional environment,

contained in the storage facility; and

d) a video display unit for rendering the video outputs generated by the processing unit.

35. The system of claim 34 wherein the state information for each of the thumbnails contained in the storage facility includes an indication of whether or not the thumbnail is active, and

wherein the processing unit determines that a thumbnail is active if a cursor is located on or over a thumbnail based on the two-dimensional location of the cursor and the two dimensional location of the thumbnail.

36. The system of claim 34 wherein the storage facility further contains descriptive textual information for each of the thumbnails, and

wherein, if a thumbnail is active,

i) the processing unit generates a pop-up bar, based on descriptive textual information, for the active thumbnail, and

ii) the video display unit renders the pop-up bar over the rendered thumbnail.

37. The system of claim 35 wherein, if a thumbnail is active or floated and the input facility accepts a selection input, then

i) the processing unit updates the state of the thumbnail,

ii) the processing unit gets a second, higher resolution, visual representation of the object represented by and associated with the thumbnail,

iii) the processing unit generates a video output based on the higher resolution, visual representation of the object represented by and associated with the thumbnail at a preferred viewing location, and

iv) the video display device renders the video output generated by the processing unit.

38. The system of claim 37 further comprising an audio output device,

wherein the storage facility further contains a first audio cue, and

wherein, when an object is selected, the processing unit provides the first audio cue to the audio output device.

39. The system of claim 37 wherein each thumbnail is a 64 pixel by 64 pixel bit map having 24 bit color and wherein each higher resolution, visual representation of the objects is a 512 pixel by 512 pixel bit map having 24 bit color.

40. The system of claim 37 wherein the processing unit further effects a video output based on an animation of the higher resolution, visual representation of the object represented by and associated with the thumbnail, moving from the location of the thumbnail to a location at the foreground of the three-dimensional environment.

41. The system of claim 35 wherein if the input facility provides a float input and an active thumbnail exists, then the processing unit will set the depth of the active thumbnail to a predetermined value and will define the state of the active thumbnail as floated.

42. The system of claim 35 wherein, if a thumbnail is active and the input facility accepts a selection input, then

i) the processing unit updates the state of the thumbnail to selected,

ii) the processing unit opens an application with which the object, associated with and represented by the selected thumbnail, is associated,

iii) the processing unit loads the object into the application,

iv) the processing unit generates a video output based on the object loaded onto the opened application and a preferred viewing location, and

v) the video display device renders the video output generated by the processing unit.

43. The system of claim 41 wherein if the input facility provides a sink input and if a floated thumbnail exists, then the processing unit will set the depth of the floated thumbnail to a previous value and will define a state of the floated thumbnail as active.

44. The system of claim 37 wherein, if a thumbnail is active or floated and the input facility accepts a move input, then

i) the processing unit updates the state and location of the thumbnail,

ii) the processing unit generates a video output based on the updated location of the thumbnail, and

iii) the video display device renders the video output generated by the processing unit.

45. The system of claim 35 wherein if a thumbnail is floated and the input facility accepts a selection input, then

i) the processing unit updates the state of the thumbnail to selected,

ii) the processing unit opens an application with which the object, associated with and represented by the selected thumbnail, is associated,

iii) the processing unit loads the object into the application,

iv) the processing unit generates a video output based on the object loaded onto the opened application and a preferred viewing location, and

v) the video display device renders the video output generated by the processing unit.

46. The system of claim 34 wherein the storage facility further contains virtual viewing point location information,

wherein the input facility includes a mouse, and

wherein the processing unit

d) accepts inputs from the user input device;

e) determines a viewing point location and direction based on the accepted inputs; and

f) generates only that portion of the three-dimensional environment and only those thumbnails that are in front of the virtual viewing point determined in step (e), to be rendered on the video display device.

47. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 1.

48. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 6.

49. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 7.

50. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 8.

51. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 9.

52. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 10.

53. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 11.

54. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 12.

55. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 13.

56. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 14.

57. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 15.

58. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 18.

59. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 19.

60. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 20.

61. A man-machine interface method for permitting a user to act on thumbnails, each thumbnail representing an associated object containing information, for use with a machine

having a video display device and a user input device, the man-machine interface method comprising:

a) generating a three-dimensional environment, having a depth, to be rendered on the video display device;

b) determining a two-dimensional location and a depth of each of the thumbnails in the three-dimensional environment, wherein, for each of the thumbnails, the depth is a function of at least one property of the object associated with the thumbnail; and

c) generating the thumbnails within the three-dimensional environment, at the determined two-dimensional locations and depths, to be rendered on the video display device.

62. A system which permits a user to interact with thumbnails, each thumbnail representing an associated object containing information, the system comprising:

a) an input facility for accepting user inputs;

b) a storage facility containing

i) a two-dimensional location, a depth and state information for each of the thumbnails;

ii) a two-dimensional cursor location, and

iii) a three-dimensional environment having a simulated depth;

c) a processing unit which

i) accepts user inputs from the input facility,

ii) updates (a) the two-dimensional location, and state information for each of the thumbnails contained in the storage facility, and (b) the two-dimensional cursor location contained in the storage facility, based on the accepted user inputs,

iii) updates depth information for each of the thumbnails contained in the storage facility based on at least one property of the object associated with the thumbnail, and

iv) generates video outputs based on

A) the two-dimensional location, depth and state information for each of the thumbnails,

B) the two-dimensional cursor location, and

C) the three-dimensional environment,

contained in the storage facility; and

d) a video display unit for rendering the video outputs generated by the processing unit.

63. A machine readable medium containing data and machine executable instructions which, when executed by a machine, performs the method of claim 61.